

Ethics Of Bull Trout Restoration And Management

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Abstract. - Recognition of bull trout (*Salvelinus confluentus*) as a species in 1978, and of environmental ethics as an emerging branch of philosophy in 1979, less than 20 years ago, makes them both "new". Environmental philosophy may be traced back at least as far as St. Francis of Assisi early in the thirteenth century, but it was another 600 years before Ralph Waldo Emerson and Henry David Thoreau introduced it to North America. They were followed by John Muir and pioneer conservationists Gifford Pinchot and Aldo Leopold at the end of the nineteenth and first half of the twentieth centuries. Although value issues are of increasing importance as a means of understanding and solving contemporary environmental problems, narrow academic backgrounds and traditional scientific rigidity among decision makers have impeded proper consideration of ethics in the decision-making process. Facts tend to be concrete and unimpeachable, whereas values and ethics are elusive and relative. Emergence in 1979 of the journal *Environmental Ethics* constituted a major breakthrough in communication between philosophers and scientists. Aldo Leopold's Land Ethic and related philosophical concepts provide solid foundation for restoration of bull trout and their native habitats, and constitute a management direction strongly supported by most contemporary environmental philosophers. Adherence to these principles provides the best chance for constructing biologically and ethically sound restoration programs.

The Beginning

I retired in 1990 following a 40-year career that began as a fishery research biologist with the U.S. Fish and Wildlife Service and ended with the California Department of Fish and Game supervising research and management in one of the most geographically diverse areas in North America. My jurisdiction encompassed both 4,418 m Mt. Whitney and Death Valley National Monument's Badwater at an elevation of -85 m 129 km to the east. These two sites represent two elevational extremes in the contiguous 48 states. It is no coincidence that this 4 million ha area is perhaps the nation's most heavily used recreational resource, with most visitor use oriented toward aquatic resources. Anglers vie for trout in high mountain lakes, streams, and intensively managed reservoirs, and nature enthusiasts on the floor of Death Valley watch pupfish (*Cyprinodon salinus milleri*) frolic in water five times the salinity of the ocean and approaching 40°C.

It became apparent to me a number of years ago that science in general seemed to be creating far more resource management problems than it was solving, and that philosophical or value issues were almost totally ignored, both by agency administrators and the educational institutions that produced them. No doubt much of this problem stems from the fact that most biologists are taught by Doctors of Philosophy who have neither read a philosophy paper nor show any real interest in doing so. Normally only in their later years, when biologists begin to mature and think more in terms of leaving meaningful legacies than in achieving agency or academic advancement and prestige, does philosophical depth begin to emerge. I was fortunate to have studied wildlife conservation at Berkeley under A. Starker Leopold, Aldo's eldest son, beginning in 1949, the year following Aldo's untimely death. Starker was indeed a "chip off the old block," so wildlife values quickly became a major part of my

education. Even so, the significance of this fortuitous association was not readily apparent to me (Pister 1987).

In 1979 the new journal *Environmental Ethics* appeared, described on its cover as "An interdisciplinary journal dedicated to the philosophical aspects of environmental problems." Fascinated, I contacted journal editor Eugene C. Hargrove, then at the University of New Mexico, to learn about this promising new field and how it might help me to approach and solve resource management problems as unpredictably complex and diverse as the area in which I was working. I was not disappointed with this refreshing new perspective, which served both to clarify and quantify many of the uncertainties that my work tended to engender (Pister 1985, 1987). It became immediately apparent that most environmental philosophers know far more about biology than most biologists know about philosophy! I was fascinated as I learned more about its history and development (Hargrove 1989; Nash 1989).

During the last decade of my tenure with the California Department of Fish and Game, I found myself increasingly involved in examining philosophical issues related to my work; not simply because it was intriguing, but because it offered new insight into the solution of my problems. As others learned of my involvement, they too evinced increasing interest, and as a result, I have spent much of the past four years following retirement writing and lecturing in this field throughout North America. In the words of the immortal Pogo, I have found myself "faced with insurmountable opportunities."

When Kerry Brewin invited me to participate in this symposium, I eagerly accepted. Bull trout (*Salvelinus confluentus*) habitats are very different from the desert waters I am accustomed to, yet they present common problems of habitat integrity and species value. Besides, this "new"

species (Cavender 1978, 1980; Haas and McPhail 1991) provided a challenge I could not refuse.

Warming periods that accompanied glacial recession in northern latitudes during the late Pleistocene Epoch likewise lessened rains and mountain snows that had created lakes covering much of the intermountain west. Fishes in the north then invaded and evolved within new habitats as glaciers receded (Cavender 1978; Haas and McPhail 1991). Fish in desert areas likewise began to evolve within shrinking and vastly more restricted habitats. One could be dealing with Death Valley's Devil's Hole (about the size of a backyard swimming pool) and its endemic pupfish (*Cyprinodon diabolis*), described by a National Park Service interpretive sign stating: "These fish live in what is probably the most restricted environment of any animal in the world;" or one could be discussing stocks of lake trout (*Salvelinus namaycush*) in Lake Superior, the world's largest body of fresh water. Yet the stocks of lake trout associated with specific areas within Lake Superior are as dependent upon the reefs on which they spawn, and bull trout as dependent upon the unique character of their native waters, as are the Devils Hole pupfish upon the few square feet of limestone shelf that provide their sole spawning and feeding area. From the evolutionary standpoint, specialized stocks (be they lake trout, bull trout, or other taxa) in more northern latitudes are as unique as Devils Hole pupfish that were isolated from their progenitors more than 45,000 years ago as pluvial Lake Ash Meadows receded.

Habitat degradation has exerted great influence upon native fishes throughout the Western Hemisphere. As pollution, habitat degradation, and introduction of non-native fishes have been major factors in decimating bull trout populations, in like manner dewatering for irrigation, lowering water tables, largemouth bass (*Micropterus salmoides*), and other introduced predators and competitors have exerted similar influence upon native fishes throughout the southwest.

Enough for history and background. Where do we go from here? How do we place values upon things like pupfish and bull trout, and habitat integrity within bull trout streams and desert springs?

Common Ground

To bring us to a common understanding of the often confusing concept of values, let me use an illustration adapted from Norton (1987). Imagine a family living within the Mississippi River flood plain during the summer of 1993. Rains continue, and the family knows they must leave for higher ground within the next few hours. Everything left behind will inevitably be destroyed or rendered useless. Only their most essential possessions are to be loaded into the family station wagon.

After all items are packed, there is still room for one small addition. They can take the old family Bible, dating back to the eighteenth century with all recorded births and deaths in the handwriting of the patriarchs and matriarchs of past generations, or they can take a small box of videotapes of the children's favorite television programs. The parents poll the family. The younger children want the videotapes, oblivious to the values to be found within the Bible. A teen-ager

suggests an easy way out by phoning a nearby pawn shop, with current cash value to be the determining factor. However, the parents exert their authority and take the Bible, secure in the knowledge that with added maturity, the children will understand the relative values involved and the wisdom of their decision. This metaphor bears wide application in the natural world!

About half way into my career I was exposed to this concept. At one time concerned biologists held all of the remaining individuals of a genus (*Empetrichthys*) in a small horse trough while preparing a temporary refuge pond on the Desert National Wildlife Refuge north of Las Vegas, Nevada. On another occasion I held all that remained of an entire species (*Cyprinodon radiosus*) in two buckets, one in either hand, while several colleagues (unaware of my plight) conducted creel censuses on a nearby rainbow trout reservoir (Pister 1985, 1993). I remember trying to explain my unexpected absence from the reservoir project to an official from my agency who had a very different set of values and clearly recall his rebuke: "Maybe someday you will get your priorities straight!" Aldo Leopold's admonition comes to mind: "One of the penalties of ecological education is that one lives alone in a world of wounds" (Leopold 1953).

Evolution of Natural Values

The frontier mentality that originally pervaded North America remained firmly in place (and still does in certain areas and circumstances) until Ralph Waldo Emerson (1836) and Henry David Thoreau (1863) brought up the point during the nineteenth century that uses other than utilitarian might be made of nature (Callicott 1991; Nash 1989). John Muir (1894, 1901) took over where they left off and invoked the philosophies of Emerson and Thoreau as the basis of a campaign for appreciation and preservation of wilderness. Value issues are given detailed discussion in Rolston (1981, 1986, and 1988a).

In 1889 Gifford Pinchot, with a deep interest in forest practices, graduated from Yale University. Because Yale did not have a forestry program at that time, he travelled to Europe where he was introduced formally to the profession. As the first Chief of an embryonic USDA Forest Service in 1905, Pinchot (1947) defined conservation as being "the greatest good of the greatest number for the longest time." This concept, now termed the Resource Conservation Ethic, fit nicely into highly utilitarian values of the new Forest Service and even today underlies and directs basic conservation policy of most resource management agencies. However, as different as was their basic thinking, both conservationist (Pinchot) and preservationist (Muir) believed that only *people* possess intrinsic value, and that *nature* possesses only instrumental value. Both regarded only *human* interests as legitimate (Callicott 1991).

It remained for Aldo Leopold, who followed Pinchot from Yale in 1909 (by then Yale had a forestry department, funded by the wealthy Pinchot family), to bring all this into an ecological perspective and clarify related ethical implications. Although Leopold began his career as a strong supporter of Pinchot's Resource Conservation Ethic, his training and

intuition as an ecologist caused him to break away and formulate his now famous Evolutionary-Ecological Land Ethic, which designated humans as part of the earth ecosystem and not separate from it. Environmental impacts that affected other organisms would then ultimately affect *Homo sapiens* (Callicott 1989a). His Land Ethic placed *Homo sapiens* as "plain member and citizen of the land community" and strongly implied intrinsic value for all creatures by granting "respect for his fellow members and also respect for the community as such."

Based upon the Land Ethic, Callicott (1991) derived five "commandments" from Leopold's text: 1) thou shalt not extirpate species or render them extinct; 2) thou shalt exercise great caution in introducing exotic species into local ecosystems; 3) thou shalt exercise great caution in extracting energy from the soil and releasing it into the biota; 4) thou shalt exercise great caution in damming and polluting watercourses; and 5) thou shalt be especially solicitous of predatory birds and mammals. Commandments 1, 2, and 4 are especially applicable to bull trout conservation and to fishery management generally. In his apt paper *Why Should We Care About Rare Species?*, Gunn (1980) writes:

I believe that human beings have a duty to maintain the fragile stability of what is left, and to endeavour, where possible, to recreate approximations to natural communities. In practical terms this means the attempt to provide suitable habitat for a wide range of mutually compatible plants and animals, and positive action to remedy the effects of past destructions - for example, the U.S. Fish and Wildlife Service's efforts to reintroduce peregrine falcons to their former haunts [or bull trout into their native habitats].

The A/B Dichotomy

Leopold early on detected a philosophical rift within the conservation community (Leopold 1949; Pister 1987, 1992), and presented in *A Sand County Almanac* his concept of the A/B dichotomy: "Conservationists are notorious for their dissensions.... In each field one group (A) regards the land as soil, and its function as commodity-production; another group (B) regards the land as a biota, and its function as something broader."

A's and B's have long been apparent in fishery management, relative to bull trout management and conservation philosophies generally. A's remain strong supporters of maximizing commercial and sport angling yields (i.e., promoting introduction of non-native game fishes), whereas B's are surely interested in this goal, but would prefer to attain it by using native species and stocks, and most assuredly not by any means that might jeopardize the native fish fauna. Admittedly, this entire issue has been greatly complicated by the recent identification of diminishing bull trout stocks, long after introduction into their native waters of species (i.e., eastern brook char, *Salvelinus fontinalis*) that compete and hybridize with them (Buktenica 1997). Nevertheless, philosopher Hugh Nibley observes: "...we have taught our children by precept and example that every living

thing exists to be converted into cash, and that whatever would not yield a return should be quickly exterminated to make way for creatures that do" (Nibley 1978).

Peripheral Observations

During an expedition to the East Indies in the early 1860's, Alfred Russel Wallace (1863) was deeply impressed by the natural history of the area, ranging from indigenous human populations to insects and plants. Wishing to impress the British (and world) scientific communities with the enormous potential value of such things, he wrote convincingly of the need to add to the collections of Europe's national museums (and, by inference, to preserve them in their natural habitats). He characterized "every species of animal and plant now living as the individual letters which go to make up one of the volumes of our earth's history; ". . . ending with an eloquent plea to collect and preserve them. He concluded with a prophetic statement that might well have been printed in this morning's edition of *USA Today*: "If this is not done, future ages will certainly look back upon us as a people so immersed in the pursuit of wealth as to be blind to higher considerations. They will charge us with having culpably allowed the destruction of some of those records of Creation which we had it in our power to preserve; and while professing to regard every living thing as the direct handiwork and best evidence of a Creator, yet, with a strange inconsistency, seeing many of them perish irrecoverably from the face of the earth, uncared for and unknown."

Preoccupation with economics and political expediency often tends to subordinate our appreciation of the marvel of indigenous populations and life forms. We normally fail to consider our own transient and insignificant role in the overall evolutionary process and assume an attitude characterized by David Ehrenfeld as "the arrogance of humanism" (Ehrenfeld 1978). To place this in a more understandable time perspective, Milbrath (1989) uses an analogy of the height of New York City's Empire State Building which, including the television tower, stands at about 449 m. Allowing this to represent geological time since the beginning of the earth (4.6 billion years), the time since Columbus arrived in America (500 years) would be the equivalent to the thickness of one sheet of paper. The 100 years of industrialization that have caused our current environmental dilemma would be equivalent to one fifth the thickness of one sheet of paper!

Compared to the marvel represented by bull trout habitats and evolution of their associated faunal complexes, such things as the paintings of Rembrandt and Da Vinci pale into insignificance. Yet collectors will pay millions of dollars to own a single piece of their art work. A logical question follows: How much is it worth to us to restore the bull trout studios and their associated art works? This question needs to be addressed and answered in the context of the preceding metaphor.

A related point is that bull trout stocks should be considered fully as much for their intrinsic as for their instrumental value. Instrumental values are subject to change with whims in societal and economic interests. Intrinsic values, by their very nature, tend to retain a stability that can

only increase as our perception heightens with the passage of time.

New Trends

Unfortunately, society assumes that the status quo has always been thus and will continue indefinitely into the future. Adversarial forces that initially depleted bull trout populations almost to a point of no return were of relatively short duration, perhaps 100 years. Societal values are showing definite signs of changing. For instance, California fishing license sales declined by 29% during the 1980s. In 1980 about one in ten Californians bought a fishing license, whereas in 1989 only one in twenty Californians did so (Pister 1992). Analysts attribute this decline, among other factors, to demographic changes that have resulted in a greater diversity of recreational interests. This has caused hunting and fishing to face increased competition from other sports, and to a declining rural population, which traditionally has been the staunchest supporter of hunting and fishing. Hunting license sales dropped by a similar figure during the 1980s.

These trends are likely to continue. It is almost certain that values and priorities in other areas of North America will also change, likely in the direction indicated by California. We can state with some certainty that when compared to the year 1993, interests and values will be even more different in 2093 than they were in 1893. As North America increases in sophistication, it seems likely that outdoor interests will fall more into those areas defined by Aldo Leopold (1949) as wildlife research.

This phenomenon is reflected in television programming. Whereas a decade ago most television productions relating to fish and wildlife concerned some phase of consumptive harvest, more recently such productions have given way almost entirely to various phases of animal behavior and ecology. Referring back to the earlier metaphor equating family bibles with videotapes, it appears that North Americans now are experiencing less difficulty in making this distinction in values.

"The Upshot"

In case the reader may still be wondering why I have gone to such lengths to lay out an extensive array of ethical history and application, I want to make it clear that individually and collectively, we carry an ethical obligation to:

1. Make every effort to effect whatever environmental improvements may be necessary to return bull trout habitats to a level of water and habitat quality required to support a full program of restoration (Gunn 1991). This would include vigorously pursuing programs designed to identify and remove introduced competitors and other deleterious species or strengthening programs to eliminate or drastically reduce their influence;
2. Recognize those bull trout stocks that still exist within their native waters, and manage and protect them to assure their continued existence;
3. Continue to work toward restoring those stocks that bear the greatest potential for reestablishment;

4. Be especially critical of new programs suggesting introduction of any species not already in the system (Callicott 1991); and
5. Develop programs designed to communicate to the public the intrinsic value of all life and our obligation to protect and preserve them (Callicott 1989b; Ehrenfeld 1976; Norton 1983; Regan 1983).

Such concepts as intrinsic value are new to our profession and are by no means universally accepted by decision makers (Norton 1987). We are therefore fortunate, in justifying this work politically, that bull trout possess long-recognized instrumental value by having sustained for many years sport catches and trophy fish throughout their native range. The promise of restoration of such fisheries should do much toward furthering programs designed to accomplish this.

We may now add to this instrumental motivation and justification those intrinsic values which thoughtful scientists and managers should associate with *all* life forms (Ehrenfeld 1976). Certain stocks of bull trout add an intrinsic value likely warranting consideration under the Endangered Species Act of 1973, as amended, especially as technological refinements allow more precise means of stock identification (Cavender 1978; Leary et al. 1993). Other native fishes within the ecosystem add to this value.

Adherence to the above objectives would appear to be in line with the mission of the new National Biological Survey within the U.S. "to gather, analyze, and disseminate the information necessary for wise stewardship of our nation's natural resources, and to foster an understanding of our biological systems and the benefits they provide to society" (National Research Council 1993).

Maintaining Biological Integrity in a Changing World

As we move into a new century, fisheries professionals should be heeding the gentle breezes that inevitably precede winds of change, in perception of bull trout populations and elsewhere. Value shifts from traditional programs to such things as biodiversity conservation should be welcomed by top administrators, as painful as change may be. I fully recognize that rebels, or rebellious thoughts, are seldom welcomed by those who must adjust budgets and explain innovative programs to an ever more critical and inflexible public. We may, however, find a ray of hope in this observation of German physicist Max Planck (Platt 1992):

"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."

The need for a shift in conservation values is eloquently and firmly stated by Indiana University's Lynton K. Caldwell (Miller 1988, Foreword):

"The environmental crisis is an outward manifestation of a crisis of mind and spirit. There could be no

greater misconception of its meaning than to believe it to be concerned only with endangered wildlife, human-made ugliness, and pollution. These are part of it, but more importantly, *the crisis is concerned with the kind of creatures we are and what we must become in order to survive* (emphasis added)."

We, do, after all, have only one opportunity to leave a meaningful legacy to future generations. I would hope that the legacy stemming from this excellent meeting might lie somewhere within the thinking of one of the nation's leading contemporary environmental philosophers:

"A species [for stock] is what it is inseparably from the environmental niche into which it fits. Although a creative response within it, the species has the form of the niche . . . The species stands off the world; at the same time it interacts with its environment, functions in the ecosystem, and is supported and shaped by it . . . Integrity in the species fits into integrity in the ecosystem . . . It is not preservation of *species* that we wish but the preservation of *species in the system*. It is not merely *what* they are but *where* they are that we must value correctly. (Rolston 1988b).

Rolston's thinking blends well with a renowned corollary to The Land Ethic. The following excerpt from *A Sand County Almanac* appears tailor-made for our current bull trout dilemma:

"The 'key-log' which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use [or water-use] as solely an economic problem. Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. *A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.*

It of course goes without saying that economic feasibility limits the tether of what can or cannot be done for land. It always has and it always will. The fallacy the economic determinists have tied around our collective neck, and which we now need to cast off, is the belief that economics determines *all* land use. This is simply not true.

An innumerable host of actions and attitudes, comprising perhaps the bulk of all land relations, is determined by the land-users' tastes and predilections, rather than by his purse. The bulk of all land relations hinges on investments of time, forethought, skill, and faith rather than on investments of cash. *As a land-user thinketh, so is he* (emphases added)."

What I have presented up to this point constitutes, in effect, what I feel to be an ethically acceptable road map indicating the major routes leading from Point A (where I believe we are

now) to Point B (our destination). The offramps, stoplights, and gasoline pumps must be identified by those more familiar with bull trout restoration than I am, and it is gratifying that there exists great talent and commitment among those parties concerned with their future. But irrespective of how it might be reached, we must keep firmly in mind the values inherent in reaching Point B, values of much greater significance to future generations than to us.

Some of what I have written may appear, on the surface, to be excessively idealistic. But the principles involved are valid and supportable both philosophically and biologically. I have learned that ethically sound programs inevitably are biologically sound and enduring programs. A set of values and ideals provides an appropriate basis for formulation of more pragmatic means of achieving them, and these same values and ideals apply equally to pupfish in Devil's Hole and bull trout in western U.S. and Canada. The reason I have drawn so heavily on the thinking of Aldo Leopold is that *A Sand County Almanac* served as my primary guidebook during 25 years as a practicing fishery biologist who spent his entire career "in the trenches" of environmental dilemmas (Pister 1987). His philosophies have never failed me, and they are especially applicable to bull trout and their restoration.

Is our goal attainable? A statement attributed to the German philosopher Goethe perhaps says it best: "Every man has only enough strength to complete those assignments of which he is fully convinced of their importance." I interpret this to mean that if we are given sufficient commitment and resources, we can do it. Now let's get on with it!!

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